



Calarasi / Romania Bioethanol plant 2nd Generation

Investment Teaser



Index

2

- 0 Executive summary
- 1 EU Green Deal
- 2 Calarasi project
- 3 Raw material & consumables
- 4 Products
- 5 Risk opportunity analysis

Annex

- 1 Project personalities
- 2 Preliminary planning
- 3 Foto documentation



wheat starch waste water evaporation plant

5 November 2020

0. Executive Summary

3

Bioethanol Plant Calarasi: Sustainability & Profitability

- naturally optimal forage corn conditions of Walachia, granary of Europe,
 - river Danube harbour, gateway to European markets,
 - patented Ahlers technology for low energy process & profitable side products:
 - 2nd generation bioethanol,
 - CO₂,
 - power feed,
 - green energy,
 - bio-fertilizer,
 - bioplastics
- + side project: organic vegetables

WE EUROPEANS ARE READY

1 Bio-Ethanol market

“Climate neutral economy” made in Europe

„**EU Green Deal**“: innovation and growth strategy to get first climate-neutral continent

Climate-friendly investments shall pay off the World market

Ahler's bio-energy technology is committed to that target

4

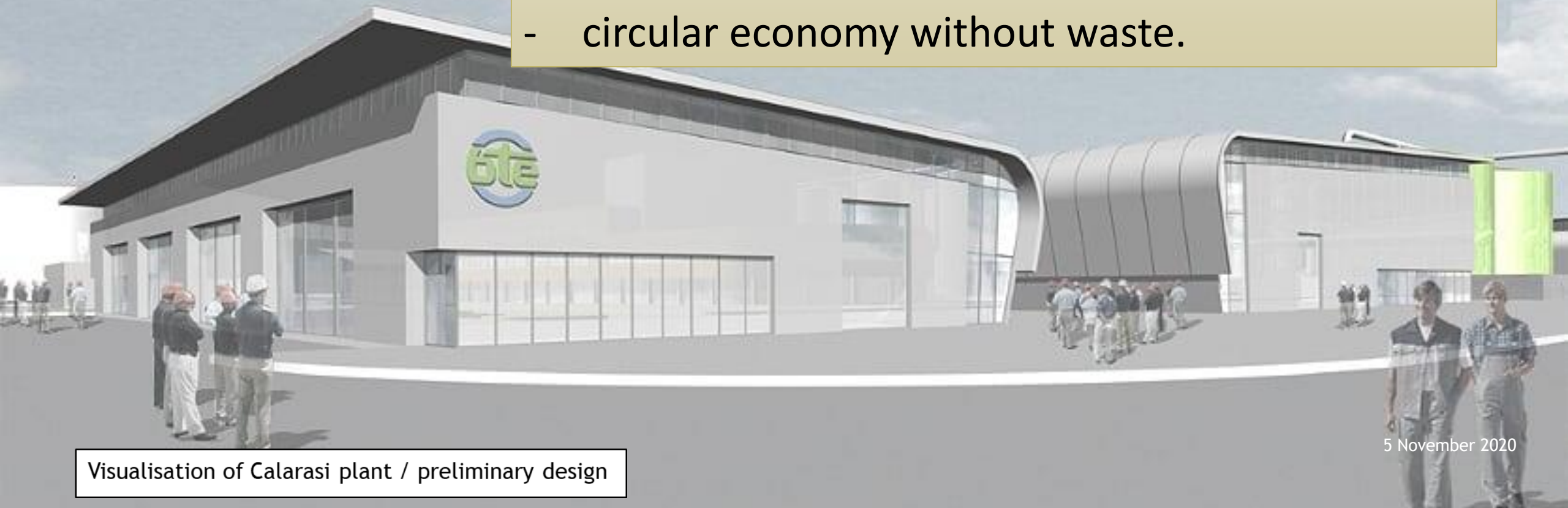
2 Calarasi project

2.1 Overall concept

5

The concept “**Bio-Energy-Farm**” amplifies the value chain by in-country refinement, leading to:

- short distances to raw materials & markets,
- circular economy without waste.



Visualisation of Calarasi plant / preliminary design

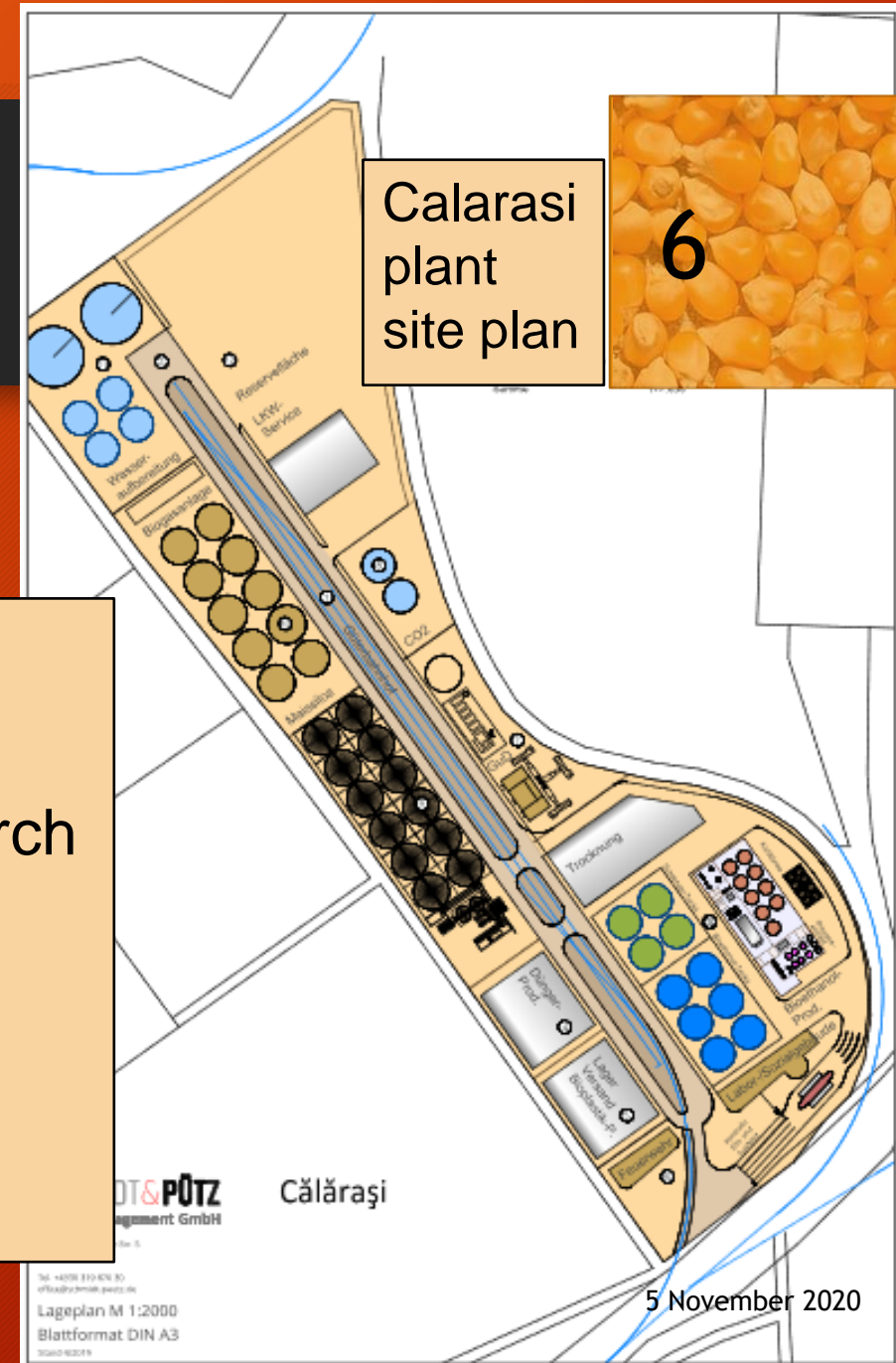
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2 Calarasi project

2.2 Engineering process

Production steps of bioethanol from grain

- 1 - Splitting of grain
- 2 - Digestion, liquefaction & saccharification of starch
- 3 - Fermentation
- 4 - Distillation / rectification / dehydration
- 5 - Stillage solid / liquid separation
- 6 - Protein feed production



Calarasi
plant
site plan

6

2 Calarasi project

2.3 Land



- Broad 12 ha for the plant (incl. room for extension), silos, office and workshop.
- Site located on former industrial area with cleaned soil.
- Adjacent 60 ha plot for further enterprises: greenhouse, bioplastics plant & food.

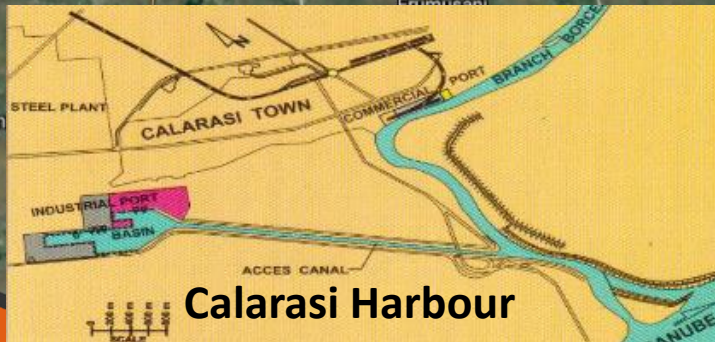


2 Calarasi project

2.4 Infrastructure & connectivity

8

Bucharest



- **Location:** on industrial site, soil cleaned with building permit.
- **Rail:** plant with rail connection, RW station Calarasi South, rail connection via Ciulnita to Bucharest and Constanta.
- **Port:** a branch canal connects the industrial site with the Danube and can be dug out for reactivation. Bulgaria ferry.
- **National roads:** DN3 Bucharest – Calarasi - Constanta, DN3B Calarasi - Fetesti, DN31 Oltenita - Calarasi.

Constanta

Calarasi

Danube

Bulgaria

5 November 2020

3 Raw material & consumables

3.1 Grain maiz

9

Grain maiz silos



Grain maiz demand
210,000 t/a (630 t/day)

- Romania is one of the **top producers of grain maize** in the EU.
- 90% of the annual 10 to 15 million t of grain maize is **exported as animal feed**.
- Calarasi is located in the middle of the **large corn cultivation area** in south-east Romania. By means of cooperation agreements, the local farmers deliver their corn to the bioethanol company without any intermediate trade.
- The supply over the year takes place via **own silos** as well as the silos of the farmers

3 Raw material & consumables

3.2 Electricity, gas & water

10

Based on **existing connectivity** of the former industrial site infrastructure, high-voltage power lines, gas pipeline and railroad tracks are in immediate vicinity. 825 m³/d water can be recovered by groundwater wells.



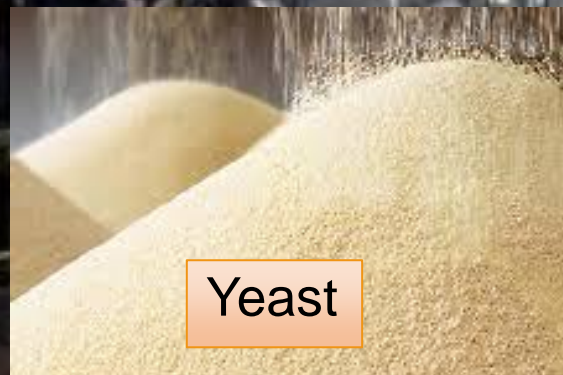
Visualisation of Calarasi plant / preliminary design

5 November 2020

3 Raw material & consumables

3.3 Additive substances

11



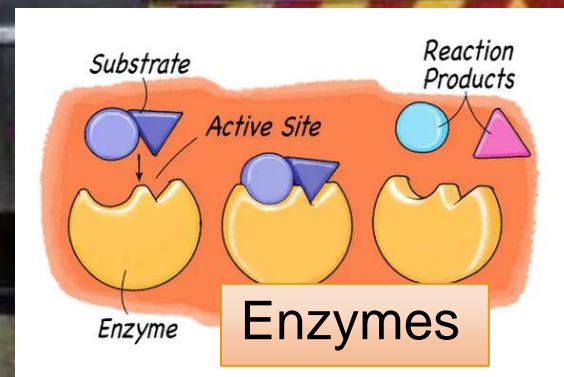
Yeast



Caustic Soda



Minerals



Sulphuric Acid

4 Products

4.1 Bioethanol 2nd Generation

12



**Calarasi plant production:
65,000 t/a of 2G bioethanol**

To reduce emissions of combustion engines, Bioethanol is the most important low-greenhouse gas fuel for **“defossilization”**.

2G bioethanol as a blending component will:

- diversify the fuel mix,
- meet the increasing requirements of emissions legislation
- and engine technology.

4 Products

4.2 CO₂

13

Calarasi plant production: 65.000 t CO₂/a (180 t CO₂/d)
CO₂-market price: 100-150 €/t (BusPlan: 90 €/t)

Calarasi plant carbon dioxide commercialization:

- **Chemical & beverage industry** (75%),
- Dutch vegetable industry firm which builds up **40ha greenhouse** for vegetable production next to Calarasi plant (25%).

4 Products

4.3 Power feed

Quality: Calarasi plant processed power feed fulfills all properties of fattening feed (certificate: governmental institution)

Commercialisation: Calarasi protein feed to be marketed nationally and internationally.

14
Increasing
meat demand

Increasingly
fed cereals

2019: 1.6 billion t
cereals fed

4 Products

4.4 Bio-fertilizer

15

Bio-fertilizer commercialisation

agriculture, greenhouses,
agricultural cooperatives,
building markets & forestry



Fermentation
residues



Mineral
fertilizer



Artificial
fertilizers to
be replaced

4 Products

4.5 Bioplastics

**Worldwide
demand for
biodegradable
materials**

**Polylactic
acid**

**Poyhydrox-
butyrate**

**Thermo-
plastic starch**

**Calarasi plant produces raw materials
for bioplastics by amendment of
process engineering
(Ahlers patented).**

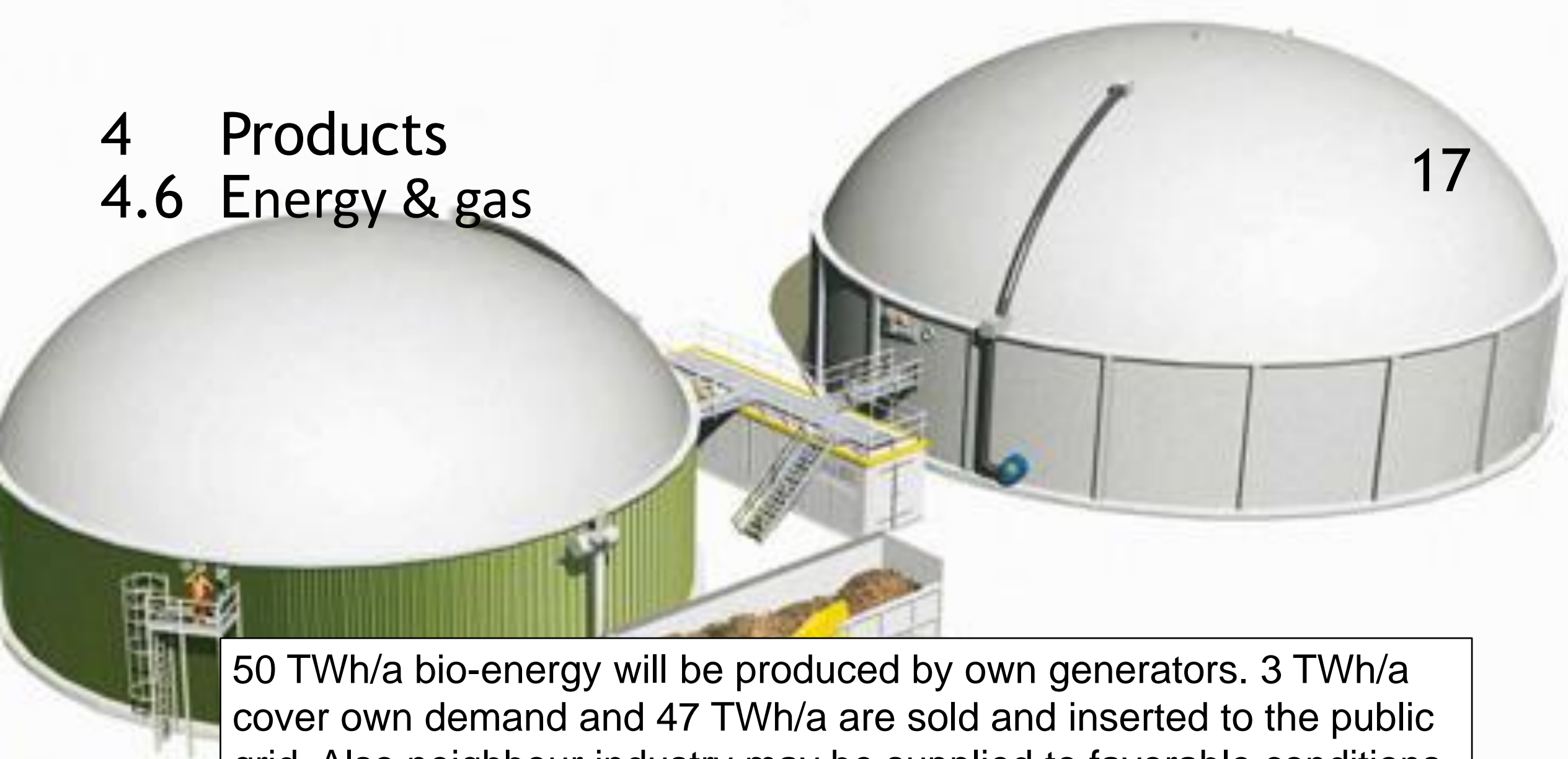
16



4 Products

4.6 Energy & gas

17



50 TWh/a bio-energy will be produced by own generators. 3 TWh/a cover own demand and 47 TWh/a are sold and inserted to the public grid. Also neighbour industry may be supplied to favorable conditions.

5 Risk-opportunity analysis

18

Strengths

- reliable national grain supply
- short distances for supply chain and equipment
- Reduction of transport costs through a circular economy
- excellent infrastructure with rail, highway and waterways (Danube)
- standardized production process
- political stability and EU integration
- Increasing the added value of agricultural products
- Rising market prices for grain can be compensated for by animal feed

Opportunities

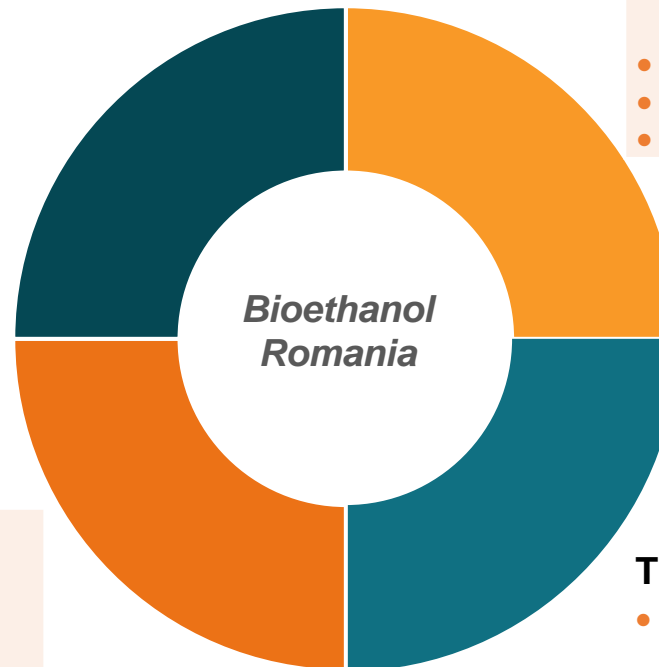
- Increasing demand for Bioethanol (especially Bioethanol 2) due to EU-order RED II
- Sustainability
- CO2-neutral productions preferred
- Subsidies (EU, Romania et al.)
- Settlement of further companies, which optimize by-products for the production of further

Weaknesses

- Business interruptions due to uncontrollable events
- Cost increase of the raw stopper material
- Use of grain with low starch content
- Fluctuating prices for 2G biofuels
- Availability of qualified personnel

Threats

- Declining importance of bioenergy due to political reorientation
- Falling market prices
- Crop failures
- Natural Disasters



Annex 1: Project personalities

Nicu Covaci

Project Partner & „**Project-Heart**“
famous Romanian
multi-sector artist & singer =>

19

Bernd Ahlers

Patent Holder & Developer
Civil Engineer, Auditor,
Researcher on:
process engineering +
agriculture + biofuel +
sector macro economics

Ion Gicu, Project Partner

Mechanical Engineer
28y erection, operation of RO
bioethanol plants + alcohol
refineries + corn industry

Matthias Lohmann

Project Partner, Civil Engineer
33y interdisciplinary engineering +
project management on intl.infra projects

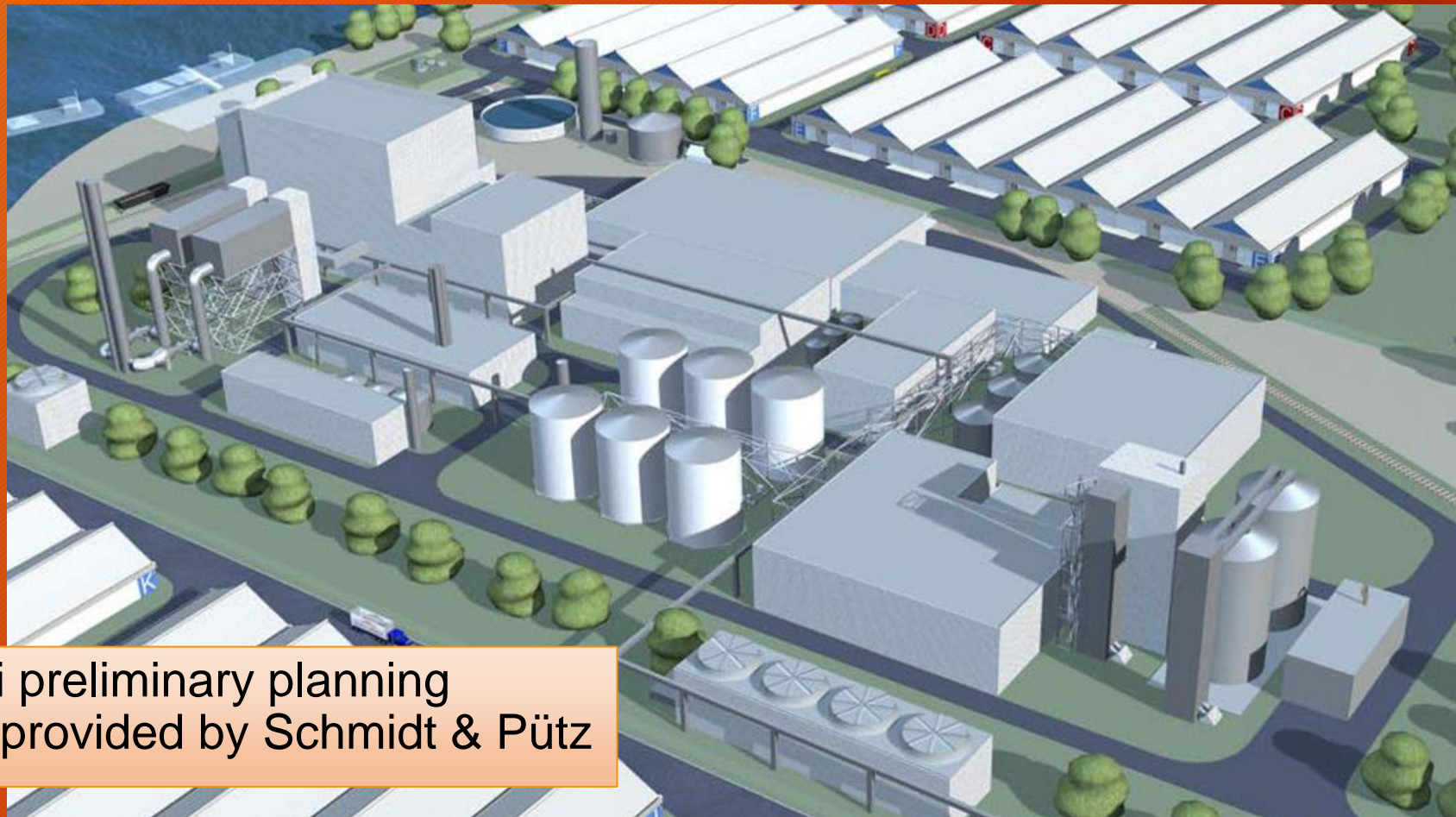
Johannes Kausler

Project Partner, Finance Manager & Business Administrative
31y CFO & generalist in intl.Finance & Operation Management



Annex 2: Preliminary planning

20



Calarasi preliminary planning
already provided by Schmidt & Pütz

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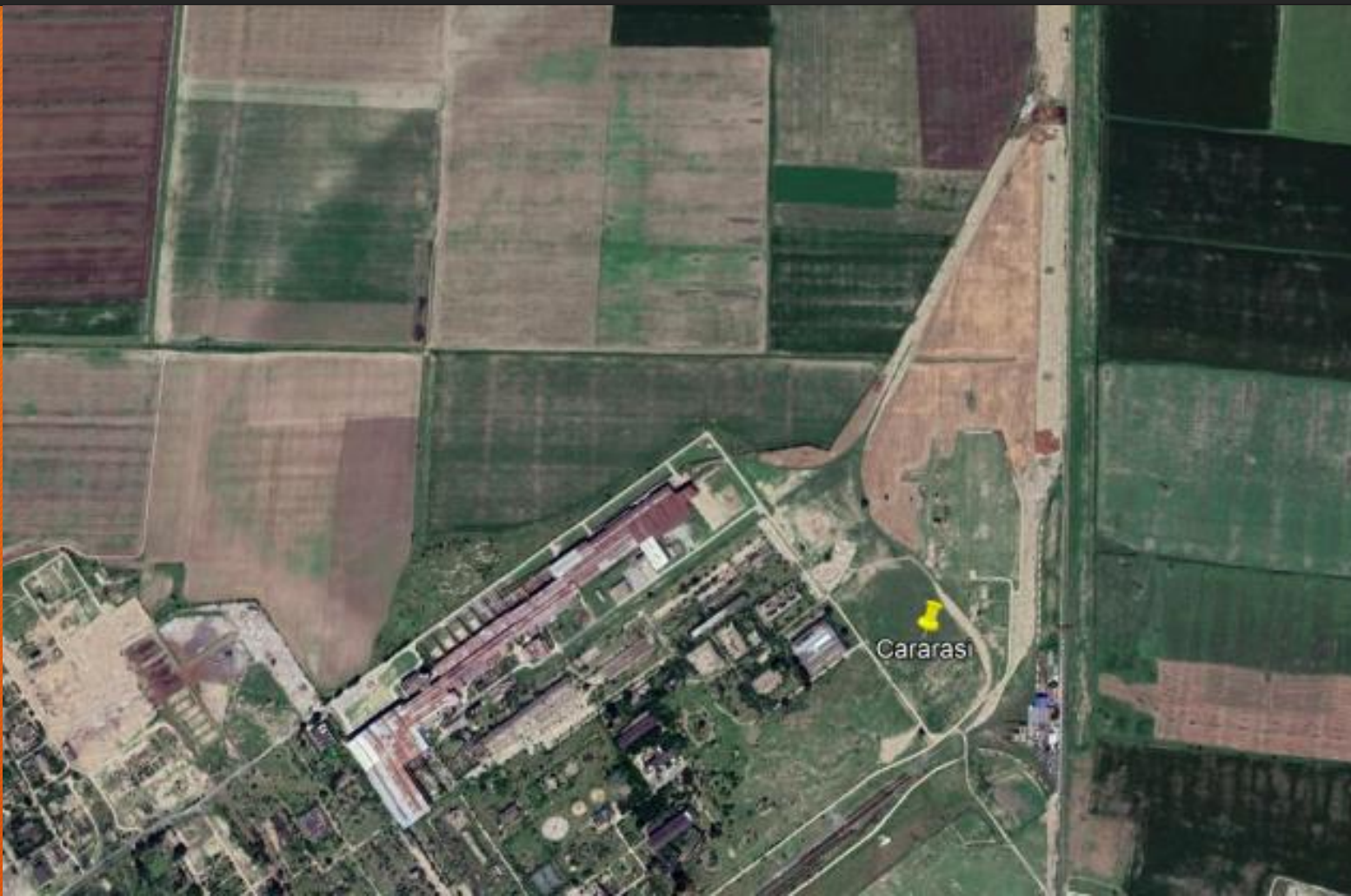
Annex 3: Foto documentation



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Annex 3: Foto documentation



Annex 3: Foto documentation

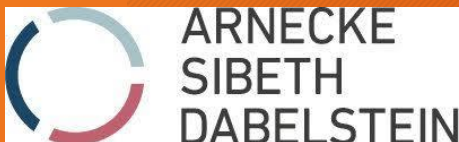




Thank you!



24



engineering new perspectives



Prinz Karl Thurn und
Taxis Management AG



- General planner: **Schmidt & Pütz Projektmanagement** www.schmidt-puetz.de
- Legal & contract management: **ARNECKE SIBETH DABELSTEIN** www.asd-law.com
- Ethanol plant technology: **GEA – Wiegand GmbH** www.gea-wiegand.de
- Biogas- & energy technology: **Ventury GmbH** www.ventury.org
- Silo- & drying system: **RIELA GmbH** www.riela.de
- Agricultural advise: **KWS Saat SE** www.kws.com
- Financial Consultant: **Prince Karl Thurn&Taxis** www.prinzkarlthurnundtaxis.ch
- Project management & infra planning: **masilo consult** www.masilo-consult.de